What kinds of processes or events might cause the Earth's climate to change?

Our position relative to the sun (orbit)
Where people live
pollution / littering / dumping
over population
tectonic plate movement
Volcanoes
tsunamis
build up of CO_2
Change in cloud cover
building more buildings
killing off a bunch of animals
tilt change of Earth's axis
burning of fuels
changing ocean currents

Climate Change Unit

End Product (Unit Assessment)

After reading informational texts and examining climate change models, write a climate assessment report in which you discuss the current impacts of climate change on Earth's systems and evaluate which future predictions are most likely. What conclusions can you draw about possible response strategies to address the impact of climate change? Support your position with evidence from the text/s. Be sure to acknowledge competing views. Include charts to help convey your message to your readers.

Climate Change Unit
Activity 1 p. E84

I Will Be Able To (IWBAT) describe the climate of my community through looking at temperature and precipitation data and determine what physical features in my community influence the local climate by looking at topographic maps. I will demonstrate my understanding in discussions with partners and written responses to prompts using vocabulary such as temperature, precipitation, and elevation.

Seré capaz de describirá el clima de mi comunidad a través de la observación de los datos de temperatura y precipitación y determinará qué características físicas de mi comunidad influyen en el clima local al observar los mapas topográficos. Demostraré mi comprensión en las discusiones con los socios y las respuestas escritas a las preguntas utilizando vocabulario como la temperatura, la precipitación y la elevación.

Climate Change Unit
Activity 1 p. E84

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 1, folder Activity 1,

1. **proceed to the assignment Climate Change Activity 1 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and What do you think? sections,**
4. **discuss your responses as a table, and**
5. **complete Parts A & B of the Investigate with a partner.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 1, carpeta Actividad 1,

1. **proceder a la tarea Actividad 1 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? ¿y, qué piensas? secciones,**
4. **discuta sus respuestas como una tabla, y**
5. **complete las Partes A y B de Investigar con un compañero.**

Climate Change Unit
Activity 1 p. E84
Digging Deeper

- Climate is influenced by several factors
- Climate is long term, while weather is day-to-day
- Each region has a definite climate
- Latitude is the measure of distance on the Earth from the equator
- The amount of solar energy an area receives depends on its latitude; places near the equator get more solar radiation so they are warmer
- Temperatures decrease one degree Fahrenheit for every three degrees of latitude away from the equator (Denver 39.7392 deg N)
- Temperatures decrease 3.6 deg F for every 1000 ft gained in elevation
- Elevation is the height of the Earth's surface as compared to sea level
- The windwards side of a mountain receives more rainfall than the leeward side (Denver is on the leeward side of the Rocky Mountains)
- When air descends the leeward side, it warms up due to the greater air pressure
- The climate of different areas can vary depending on the heat capacity of the soil & rock or large bodies of water

IWBAT describe the climate of my community through looking at temperature and precipitation data and determine what physical features in my community influence the local climate by looking at topographic maps.

Climate Change Unit
Activity 1 p. E84
Digging Deeper

- Oceans store heat during the summer and release it during the winter
- Lake-effect snow is common in late autumn when cold winds blow across the warm water accumulating moisture from the lake, travel across cold land, where the air cools and the water precipitates as snow
- Warm oceans supply moisture that feed major rainstorms
- Global Climate is the average temperature of the entire surface of the Earth
- The average temperature of the Earth is about 60 deg F.
- The global climate has changed over time.
- From the mid-1300s to the mid-1800s was the Little Ice Age when temperatures were colder than today (~3 deg F)

IWBAT describe the climate of my community through looking at temperature and precipitation data and determine what physical features in my community influence the local climate by looking at topographic maps.

Climate Change Unit 11/07/17
Activity 2 p. E96

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change. I will do this via small group and partner discussions, shared reading, written notes, and responding to questions using vocabulary such as sediment, climate and pollen.

Seré capaz de investigar y comprender la importancia de los anillos de los árboles, los núcleos de hielo glacial, el polen fósil y los sedimentos geológicos y glaciales como indicadores del cambio ambiental. Haré esto a través de discusiones en grupos pequeños y parejas, lectura compartida, notas escritas y respuestas a preguntas usando vocabulario como sedimentos, clima y polen.

Climate Change Unit
Activity 2 p. E96

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 2, folder Activity 2,

1. **proceed to the assignment Climate Change Activity 2 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 2, carpeta Actividad 2,

1. **proceder a la tarea Actividad 2 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96

After the discussion:

- **Complete Parts A & B of the Investigate with a partner.**
- **The diagrams for Part A are available in the Activity 2 folder.**
- **The clay for Part B is on top of tan cabinet 9-12.**
- **The drawing in 2a may be done via Insert -> Drawing or you may do it on paper and then insert an image of that drawing into your document.**

Después de la discusión:

- **Complete las Partes A y B de Investigar con un compañero.**
- **Los diagramas para la Parte A están disponibles en la carpeta de la Actividad 2.**
- **La arcilla para la Parte B está encima del armario marrón 9-12.**
- **El dibujo en 2a se puede hacer a través de Insertar -> Dibujar o puede hacerlo en papel y luego insertar una imagen de ese dibujo en su documento.**

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96

Digging Deeper

- A paleoclimate is a climate that existed sometime in the past. The Earth is presently experiencing an interglacial interval (a warm period between cold, glacial periods). There are only two continental ice sheets left: Greenland and Antarctica.
- Before the invention of writing, there were no records of weather
- The last retreat of the continental glaciers occurred between 20,000-8,000 years ago.
- There's an indirect record of past temperatures called climate proxies (something that represents something else indirectly).
- Pollen consists of tiny particles produced by flowers to make seeds. It is preserved in the sediments of lakes and bogs. The number of pollen grains in each layer are counted and then charted to give an idea of climate changes.
- Ice cores are a powerful technique for studying paleoclimate.
- Glaciers consist of snow that accumulates each winter and does not melt in the summer. The ice core from Antarctica records 400,000 years' of climate data.

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96

Digging Deeper

- Bubbles of air trapped in the ice contain samples of atmosphere from when the snow fell. The two Oxygen isotopes are oxygen-16 and oxygen-18. The proportion of the two depends on the average temperature of the globe. This ratio can be measured very accurately with special instruments. During warmer global climate the proportion of oxy-18 increases.
- The air bubbles in the ice contain carbon dioxide. The amount of carbon dioxide in the atmosphere can be correlated to global temperatures. When the world climate is thought to be warm, the amounts of CO_2 are higher. CO_2 is distrubuted uniformly around the world.
- More dust in the ice tells you that the winds were stronger and the climate was colder.
- During cold times, the shells of foraminifera spiral one way and in warmer times they spiral the other way. Geologists can use the oxygen in the shells to help determine climate, also.

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96

Digging Deeper

- The sediment carried and deposited by glaciers makes distinctive landforms
- Loess is fine glacial sediment picked up by the wind and deposited over large areas. Layers of loess show the different ice ages.
- Glacial sediment is different from usual ocean sediment and easy to detect.
- Trees grow more during warm years than during cold years. Bristlecone and sequoias are used because they are long-lived.

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit 11/10/17

Writing prompt:
In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 2

Solicitud de escritura:
En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 2

Climate Change Unit 11/14/17
Activity 3 p. E105

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate. I will do this via small group and partner discussions, shared reading, written notes, and responding to questions using vocabulary such as axis, rotation, and orbit.

Seré capaz de investigar y comprender la influencia de la inclinación del eje de la Tierra sobre las estaciones y la forma de la órbita de la Tierra alrededor del sol sobre el clima. Haré esto a través de discusiones en grupos pequeños y parejas, lectura compartida, notas escritas y respuestas a preguntas utilizando vocabulario como eje, rotación y órbita.

Climate Change Unit
Activity 3 p. E105

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 3, folder Activity 3,

1. **proceed to the assignment Climate Change Activity 3 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 3, carpeta Actividad 3,

1. **proceder a la tarea Actividad 3 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105

After the discussion:

- **Complete Parts A2 through E of the Investigate with a partner.**
- **The diagrams for Part A are available on the tan cabinet.**
- **The materials for the succeeding parts are on the tan cabinet, as well.**
- **Part D: Construct a 1m section from twine instead of 3m from rope. Use butcher paper and a writing implement instead of the floor and chalk.**

Después de la discusión:

- Complete las Partes A2 a E de Investigar con un compañero.
- Los diagramas para la Parte A están disponibles en el armario café.
- Los materiales para las partes siguientes también están en el armario café.
- Parte D: Construya una sección de 1 m de hilo en lugar de 3 m de la cuerda. Use papel de carnicero y un implemento de escritura en lugar del piso y la tiza.

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105

Digging Deeper

- The tilt of Earth's axis explains the seasons. When the axis is tilted toward the sun it's summer, when it's tilted away it's winter.
- Summer solstice (on/about June 22) has the longest day and shortest night in the northern hemisphere. Winter solstice (on/about December 22) has the longest night and shortest day in the northern hemisphere.
- Most climatologists believe that variations in the Earth's orbit around the Sun cause the variations in Earth's climate.
- If the Earth & Sun were the only objects in the solar system, the tilt of the Earth's axis and its orbit would remain exactly the same. The other planets exert forces which cause them to vary over time.
- There are three kinds of changes: eccentricity, obliquity, and precession.
- The Earth's orbit around the sun is an ellipse with a slight eccentricity. The eccentricity is how far from being a perfect circle an ellipse is.
- Earth's orbit varies by only 3.3%, but the insolation (energy received from the sun per unit area) can vary by 7°.
- A full cycle of increase and decrease in eccentricity takes 100,000 years. During this time, insolation varies from 2° (less than now) and 20° (much greater than now).

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105

Digging Deeper

- Earth is closest to the Sun on January 5 (perihelion) and farthest from the sun on July 5 (aphelion) which makes the summers less hot and winters less cold in the northern hemisphere.
- Obliquity is the tilt of Earth's axis away from perpendicular to its orbit.
- A smaller obliquity would mean cooler summers and warmer winters; a larger obliquity would mean hotter summers and colder winters
- The pull of other planets changes the obliquity of Earth over a 40,000 year period from a minimum of 22° to a maximum of 24.5°.
- A greater obliquity causes slightly greater seasonal differences. Lesser obliquity results in slightly smaller seasonal differences.
- Axial precession is the slow wobble of the Earth's axis. It takes 26,000 years to complete one revolution.
- Orbital precession is important to climate.
- How the precessions and the eccentricity interact with each other determines how the climate will be.
- Milutin hypothesized how Earth's climate varies with changes in insolation due to latitude and time.

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105

Digging Deeper

- There is a 100,000 year periodicity in temperatures that matches the 100,000 year eccentricity cycle shown in the Antarctic ice core data.
- The important climate mechanisms are vegetation, greenhouse gases, sea level, and the water cycle.

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit 11/27/17
Activity 4 p. E117

IWBAT understand how ocean currents are affected by Earth's moving plates. I will do this through interpreting maps and participating in class discussion. I will demonstrate my understanding through orally answering questions and correctly using vocabulary such as climate and currents.

Seré capaz de entender cómo las corrientes oceánicas se ven afectadas por las placas móviles de la Tierra. Haré esto a través de la interpretación de mapas y la participación en la discusión en clase. Demostraré mi comprensión a través de preguntas que responden oralmente y el uso correcto de vocabulario como el clima y las corrientes.

Climate Change Unit
Activity 4 p. E117

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 4, folder Activity 4,

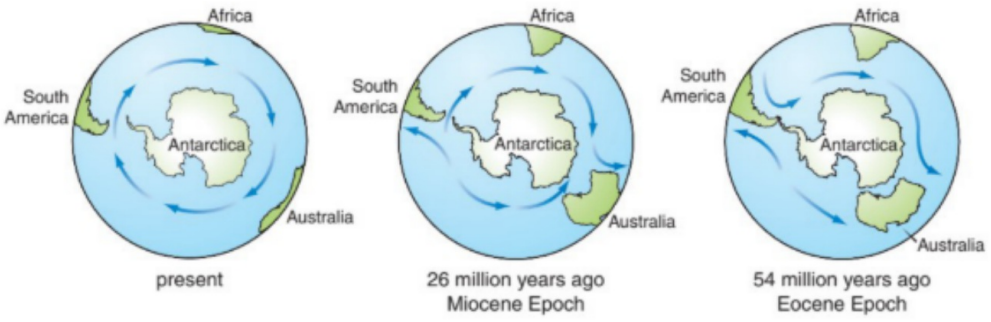
1. **proceed to the assignment Climate Change Activity 4 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 4, carpeta Actividad 4,

1. **proceder a la tarea Actividad 4 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

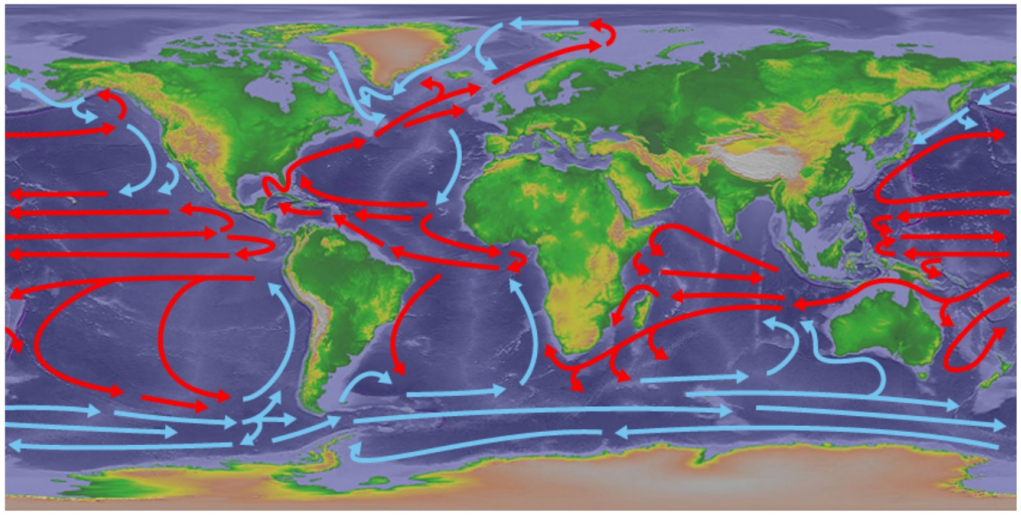
IWBAT understand how ocean currents are affected by Earth's moving plates

Climate Change Unit
Activity 4 p. E117



IWBAT understand how ocean currents are affected by Earth's moving plates

Climate Change Unit
Activity 4 p. E117



IWBAT understand how ocean currents are affected by Earth's moving plates

Climate Change Unit
Activity 4 p. E117

Digging Deeper

- A community near an ocean has a more moderate climate than one at a similar latitude inland. Water has a higher heat capacity than rocks and soil. Cold ocean currents create cooler weather on land than warm ocean currents.
- The equator receives more solar radiation than the poles so the equatorial waters are warmer than the polar waters. Ocean currents transfer heat from low latitudes to high latitudes.
- When the conveyor belt is disturbed, the entire global climate is affected. 12,000 years ago rapidly melting glaciers discharged large amounts of fresh water reducing the salinity of the oceans and disrupting the NADW.
- For an ice sheet to develop, there has to be large land areas at high latitude.
- The arrangement of the continents has a strong effect on Earth's climate.
- The ice sheet was not always on Antarctica, but formed when Antarctica moved south.
- Most of Earth's continental land mass is in the northern hemisphere.
- Volcanoes release carbon dioxide which is a gas that traps heat in the atmosphere. Eruptions also add dust to the atmosphere which blocks solar radiation, decreasing the global temperature

IWBAT understand how ocean currents affect regional and global climates.

Climate Change Unit
Activity 4 p. E117

Digging Deeper

- Weathering of mountain ranges uses up carbon dioxide from Earth's atmosphere causing global climate to cool.

IWBAT understand how ocean currents affect regional and global climates.

Climate Change Unit 11/29/17
Activity 5 p. E125

IWBAT compare data to understand the realationship of carbon dioxide to global temperature, evaluate the data to draw a conclusion, and recognize a pattern of information in a graph in order to predict future temperature. I will do this through constructing and interpreting graphs with a partner.

Seré capaz de comparar datos para comprender la relación entre el dióxido de carbono y la temperatura global, evaluar los datos para llegar a una conclusión y reconocer un patrón de información en un gráfico para predecir la temperatura futura. Lo haré construyendo e interpretando gráficos con un compañero.

Climate Change Unit
Activity 5 p. E125

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 4, folder Activity 5,

1. **proceed to the assignment Climate Change Activity 5 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 4, carpeta Actividad 5,

1. **proceder a la tarea Actividad 5 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT compare data to understand the realationship of carbon dioxide to global temperature, evaluate the data to draw a conclusion, and recognize a pattern of information in a graph in order to predict future temperature.

Climate Change Unit
Activity 5 p. E125

After the discussion:

- **Complete Parts A and B of the Investigate with a partner.**
- **The graph paper for for Part A is available on the tan cabinet.**
- **There is a handout of the graph for Part B.**
- **We are not doing Part C.**

Después de la discusión:

- Complete las Partes A y B de Investigar con un compañero.
- El papel cuadriculado para la Parte A está disponible en el armario café.
- Hay un folleto del gráfico para la Parte B.
- No estamos haciendo la Parte C.

IWBAT compare data to understand the realationship of carbon dioxide to global temperature, evaluate the data to draw a conclusion, and recognize a pattern of information in a graph in order to predict future temperature.

Climate Change Unit
Activity 5 p. E125
Digging Deeper

- When there is more carbon dioxide in the atmosphere, global temperatures are higher. Just because global temperatures and carbondioxide levels get higher together, that doesn't mean one causes the other to change. Carbon dioxide is a greenhouse gas.
- Earth is warm enough to support life because the atmospheric gases allow sunlight to pass through. Water vapor is the most important greenhouse gas. Other greenhouse gases include methane and nitrogen oxides.
- All objects emit electromagnetic radiation, the hotter the object the shorter the wavelength. Earth emits energy at longer wavelengths than the sun. Infrared radiation is sensed as heat.
- Greenhouse gases absorb the outgoing heat then they send it back onto the Earth. This is what keeps us warm.
- Oxidation occurs when plant and animal tissue decays or is digested as food and when wood and fossil fuels are burned. CO_2 is a byproduct of oxidation. CO_2 is also released into the atmosphere from volcanic eruptions.
- Carbon dioxide is used up during the weathering of rocks and plants during photosynthesis. Carbon is constantly being transformed from one form to another. The only way to remove carbon from the "active pool" is to bury it deeply with sediment. It can re-enter the surface system from the uplift of continents and weathering of carbon-rich rocks.

Climate Change Unit
Activity 5 p. E125
Digging Deeper

- The more carbon dioxide in the atmosphere, the warmer temperatures are.
- On a long time scale of hundreds of thousands of years, Milankovitch cycles control global warming. The increase in CO_2 has been a part of global warming.
- Humans have been adding a lot of CO_2 to the atmosphere by burning fossil fuels. Scientists are concerned that the temperatures will increase due to increased atmospheric CO_2.
- Many countries believe that we should reduce the amount of CO_2 going into the atmosphere to reduce the risk of rapid global temperature increase. Others disagree because they question the future danger of rapid temperature increase and not worth disrupting the present economy over. The effect of CO_2 on global warming isn't completely known.
- Reforestation (the growth of forests on previously cleared farmland) stores CO_2. The ocean also stores CO_2. Some people have suggested pumping huge amounts of CO_2 into the oceans, but that would just delay the problem for a few generations. The USA may be absorbing more CO_2 than it produces.

Climate Change Unit
Activity 6 p. E136

IWBAT brainstorm ways climate change might affect the Earth and my community, design an experiment on paper to test my ideas, explain some of the effects of global warming, understand positive and negative feedback loops, and understand and evaluate the limitations of models in studying climate change through time. I will do this through group discussion, creating a poster, and writing down an experiment design on paper which could test an aspect of climate change. I will use vocabulary such as precipitation, plant life, and atmosphere.

Seré capaz de intercambiar ideas sobre cómo el cambio climático podría afectar a la Tierra y a mi comunidad, diseñar un experimento en papel para poner a prueba mis ideas, explicar algunos de los efectos del calentamiento global, comprender circuitos de retroalimentación positivos y negativos y comprender y evaluar las limitaciones de los modelos para estudiar el cambio climático a través del tiempo. Haré esto a través de una discusión grupal, creando un póster y escribiendo un diseño de experimento en papel que podría poner a prueba un aspecto del cambio climático. Usaré vocabulario como precipitación, vida vegetal y atmósfera.

Climate Change Unit
Activity 6 p. E136

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 5, folder Activity 6,

1. **proceed to the assignment Climate Change Activity 6 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 5, carpeta Actividad 6,

1. **proceder a la tarea Actividad 6 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT brainstorm ways climate change might affect the Earth and my community, design an experiment on paper to test my ideas, and explain some of the effects of global warming.

Climate Change Unit
Activity 6 p. E136

After the discussion:

- **Complete steps 1-3 of the Investigate as a table group.**
  - **All partners must be listed in all partners' documents**
  - **All partners must list the remaining ideas on step 2**
- **The poster paper for for step 2 is available on the tan cabinet.**

Después de la discusión:

- Complete los pasos 1-3 de Investigar como un grupo de tablas.
  - Todos los socios deben figurar en todos los documentos de los socios
  - Todos los socios deben listar las ideas restantes en el paso 2
- El papel de póster para el paso 2 está disponible en el gabinete de bronceado.

IWBAT brainstorm ways climate change might affect the Earth and my community, design an experiment on paper to test my ideas, and explain some of the effects of global warming.

Climate Change Unit
Activity 6 p. E136

Digging Deeper

- It is warmer in urban areas due to pavement and less vegetation (urban heat island effect). Satellites make it easy to obtain a good estimate of global temperature. Variations in global temperatures were happening millennia before humans began releasing large quantities of CO_2 into the atmosphere. Scientists know that the global temperature is increasing, but they want to know if it's mankind or natural and how much does each contribute to the change.
- Many factors influence climate on Earth. They interact with each other in ways scientists don't fully understand. These are called feedback loops.
- Positive feedback occurs when two factors interact and the effects add up. Ice reflects a greater proportion of the Sun's radiation thereby causing the Earth to absorb less heat which causes the Earth to become cooler and form more ice.
- Understanding feedback loops is important to understanding how Earth's physical environment changes. Weathering and CO_2 are an example of a negative feedback loop. Weathering uses up CO_2 and cools the Earth.

IWBAT understand positive and negative feedback loops and understand and evaluate the limitations of models in studying climate change through time.

Climate Change Unit
Activity 6 p. E136
Digging Deeper

- Not knowing how many feedback loops there are and exactly how they work makes it difficult to predict how the Earth will react to having more CO_2. More heat can cause more evaporation generating more clouds which can have either a cooling effect or a warming effect.
- Scientists are using their computer models to develop scenarios for what increased concentrations of greenhouse gases in the atmosphere will do to the climate. Scientists improve their models based on recent data from long-used models.
- Increase in evaporation can lead to extreme weather events like hurricanes and winter snowstorms.
- Ice melt may cause a 1m rise in sea levels.
- Agriculture would be affected by rainfall patterns, some areas may become too dry and others too wet. Temperature changes may affect where crops are grown or their yields (they still grow in the same area, but produce less).
- If meltwater affects the NADW, there could be global consequences due to the change in distribution of solar heat around the globe.

IWBAT understand positive and negative feedback loops and understand and evaluate the limitations of models in studying climate change through time.